

REMARKS

The Examiner has rejected claims 1-4, 6, 7, 9, 11-15, 17, 18, 21, 23-25, 27, 28 and 32 under 35 U.S.C. 102(b) as being rejected by Airhart, U.S. Patent 4,471,963. The Examiner states that Airhart teaches a similar gear pump/fluid transfer device and shaft seal combination comprising a housing, plural plates, ports, gears, teeth, cavities, and a drive shaft (see Fig. 1 and col. 4). The shaft seal comprises a cylindrical body 36 having a core with an axial passage 40 with a groove 54.

In contrast to Airhart who teaches a water cooled shaft, Applicant's invention is an air cooled shaft seal. Airhart, in col. 6, lines 28-35, discloses "Two bores 62 are formed at diametrically opposite sides of the flange 38 to extend radially outwardly from the passageway 56 through the flange 38 to open to the outside for connection to conventional tubing or the like in a separate fluid flow system for admitting cooling fluid, e.g., water, into the passageway 56 through one bore 62 and exhausting the cooling fluid through the passage 56 through the other bore 62." The Applicant, as pointed out in the background of the specification, teaches an invention that is superior to a finned air-cooled shaft seal. On page 10, line 13-14 the description reads, "The cooling channel 90 is thereby fluidly connected to all the recesses 82 and provides a passage to allow air flow through the shaft seal for passive convective cooling." The illustrative embodiment of the invention, as shown in Fig. 11, has eight recesses, and the number and thickness of the recesses is discussed on pages 10 and 11. The recesses allow air to flow in and out of the shaft's seal, thereby cooling the core 51. In contrast, Airhart has an entrance and an exit for cooling water that feeds an annular passageway 56, which circumferentially is located in the sleeve 10. Airhart's invention requires a pumped fluid, while Applicant's invention uses passive convective air-cooling. Independent claims 1, 12 and 24 have been amended to show that there are at least three discrete readily extending recesses, and the preamble now states that the shaft's seal is air-cooled. The amended claims now clearly differentiate Applicant's invention from Airhart.

Claims 1-32 stand rejected by the Examiner under 35 U.S.C. 103(a) as being unpatentable over Stehr et al. (U.S. Patent 5,462,420) in view of Airhart. The Examiner states that Stehr discloses a gear pump/fluid transfer device and shaft seal combination comprising a housing, plural plates, ports, gears, teeth, cavities, and a drive shaft. Stehr, as admitted by the Examiner, does not teach nor disclose the radial recesses. The Examiner points out that Stehr advantageously has a duct system 35 for a cooling medium.

The Applicant's invention utilizes passive cooling. Stehr teaches a duct system, which like Airhart would require a pumped fluid medium. Stehr's invention is principally a bushing 33, having a groove/labyrinth (21) that can be quickly changed out. Stehr does not disclose the use of radial recesses, therefore, Stehr does not expand on Airhart's invention, as it relates to the instant application, which is air cooled.

The Examiner, regarding claims 5, 16 and 26, opines that while Airhart does not disclose that the surface area rounding the sidewall encompassed by the recessed openings is greater than the surface area of the remaining portions, this is considered a design choice. It is not considered inventive to discover the workable optimum ranges or routine experimentation. See *In re Aller*, 105 USPQ 233,235 (CCPA 1955).

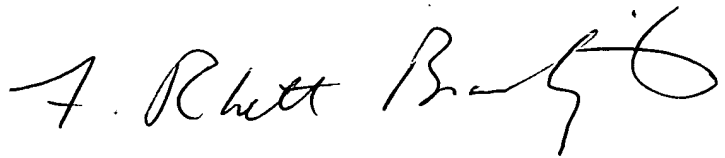
Applicant, in the background of the invention starting on page 3, line 3 discusses some of the prior art disadvantages of using finned designs. Applicant points out that the fins make it difficult to access the bolts holding the shaft seal to the pump housing, that fins can be rather fragile and that fins have a trade-off between thermal efficiency, size, and strength. Applicant discusses Airhart, U.S. Pat. 4,471,963, pointing out that cooling fluid add an additional expense and effort, and that cooling liquids require attaching fluid tubes and maintaining a continuously circulating cooling fluid system. The Examiner's comments with regards to claims 15, 16, and 26 as being merely design choices is not well reasoned as the instant invention is fundamentally different from Airhart in that one invention is air-cooled passive convective, while the other is water-cooled, and heat transfer characteristics are very

different for the two processes. Applicant has invented an improved air-cooled shaft seal, which overcomes the problems associated with finned cooled shaft seals.

In summary, the amended claims clearly distinguish the instant invention from the 102 and the 103 cited prior art and it is believed that the amended claims in view of the arguments set forth should be allowed as they overcome each of the Examiner's rejections.

There are no new claims, and there are therefore no additional fees. There is no new subject matter, and all amendments are fully supported by the specification. The application is now believed to be in condition for allowance.

Respectfully,

A handwritten signature in black ink, appearing to read "F. Rhett Brockington". The signature is fluid and cursive, with a large, stylized "B" at the end.

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